A comprehensive study of the analyzing powers of the proton-deuteron break-up reaction at 190 MeV with BINA

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Propositions belonging to the Ph.D. Thesis

A comprehensive study of the analyzing powers of the proton-deuteron break-up reaction at 190 MeV with BINA

1. Three-nucleon break-up reaction is a good tool to look into the underlying dynamics of the nuclear force, thanks to its rich kinematical phase space which has different levels of sensitivity to three-nucleon force effects.

2. Break-up experiments are challenging technically because a large-acceptance detector is needed to measure the kinematical variables of the particles in the final state of the reaction.

3. The experimental database for break-up observables has been very limited. The dataset presented in this thesis fills up several gaps in the database of the three-body break-up observables and provides a unique basis to examine theoretical approaches in the field of nuclear force studies.

4. Performing comprehensive studies to measure different break-up observables at different beam energies can lead to a better understanding of the nuclear force.

5. The overall agreement between the present data and calculations for A_x is better than for A_y. Such an inconsistency points to a deficiency in the spin structure of the description of the many-nucleon forces in the present-day calculations.

6. In the case that the theoretical predictions vary significantly within the experimental bin sizes, one needs to perform an average of the theoretical calculations over the bin sizes. Only then, one can compare theory with data.

7. Identifying all the sources of uncertainties in the experiment and estimating their values with high accuracy are mandatory when comparing data with theory.

8. Presenting results in a proper format and style is the key part of the data analysis and shows the value of data.

9. Data analysis is not only a science but also an art.